

WHAT IS CLAIMED IS:

1. A process for preparing a multi-layer article comprising:

(a) providing a precursor article comprising a curable elastomer layer, said article having an exposed surface available for application of a fluoroplastic layer;

5 (b) thermally insulating said curable elastomer layer prior to application of said fluoroplastic layer;

(c) applying a fluoroplastic composition comprising interpolymerized vinylidene fluoride units onto said exposed surface of said precursor article to form a fluoroplastic layer;

(d) heating said fluoroplastic layer; and

10 (e) curing said curable elastomer layer to form a multi-layer article comprising a fluoroplastic layer and an elastomer layer.

2. A process according to claim 1 comprising applying said fluoroplastic composition in molten form.

15 3. A process according to claim 2 comprising applying said fluoroplastic composition by extrusion coating said fluoroplastic composition through a crosshead die onto said exposed surface of said precursor article.

20 4. A process according to claim 3 wherein said die comprises a die body that receives said fluoroplastic composition, an upstream opening for receiving said precursor article, a downstream opening, and a sleeve located at least partially within said upstream opening of said die that receives said precursor article and thermally insulates said curable elastomer layer prior to application of said fluoroplastic composition.

5. A process according to claim 1 further comprising cooling said multi-layer article subsequent to heating said fluoroplastic layer.

25 6. A process according to claim 1 comprising thermally curing said curable elastomer layer.

7. A process according to claim 1 comprising curing said curable elastomer layer subsequent to heating said fluoroplastic layer.
8. A process according to claim 1 comprising providing said precursor article by extruding a curable elastomer composition through a die to form said precursor article.
- 5 9. A process according to claim 1 wherein said curable elastomer layer has an exposed surface available for application of said fluoroplastic composition and said fluoroplastic composition is applied directly to said exposed surface of said curable elastomer layer.
10. A process according to claim 1 wherein said elastomer comprises a fluoroelastomer.
11. A process according to claim 1 wherein said elastomer comprises a non-fluorinated elastomer.
- 10 12. A process according to claim 1 wherein said fluoroplastic has a melting temperature ranging from about 100 to about 330°C.
13. A process according to claim 1 wherein said fluoroplastic has a melting temperature ranging from about 150 to about 270°C.
- 15 14. A process according to claim 1 wherein said fluoroplastic comprises interpolymerized units derived from tetrafluoroethylene, vinylidene fluoride, and a monomer selected from the group consisting of hexafluoropropylene, perfluorinated alkoxy vinyl ethers, perfluorinated alkyl vinyl ethers, olefins, and combinations thereof.
15. A process according to claim 14 wherein the amount of said vinylidene fluoride units is at least 3% by weight but less than 20% by weight.
- 20 16. A process according to claim 14 wherein the amount of said vinylidene fluoride units is between 10 and 15% by weight.

17. A process according to claim 1 further comprising bonding a polymer layer to said fluoroplastic layer to form a multi-layer article comprising said fluoroplastic layer interposed between said elastomer layer and said polymer layer.

18. A process according to claim 17 comprising bonding said polymer layer directly to
5 said fluoroplastic layer.

19. A process according to claim 17 wherein said polymer comprises an elastomer.

20. A process according to claim 19 wherein said elastomer comprises a nitrile rubber.

21. A process according to claim 1 further comprising placing a polymer layer on said fluoroplastic layer prior to curing.

10 22. A process according to claim 21 wherein curing includes a first stage at a first temperature and a second stage at a second temperature, the first temperature being lower than the second temperature.

23. A process according to claim 22 wherein said polymer comprises an elastomer.

24. A process according to claim 1 wherein said multi-layer article is in the form of a tube.

25. A process according to claim 1 wherein the adhesion between said fluoroplastic layer and said elastomer layer is at least 15 N/cm.

26. A process according to claim 22 wherein the adhesion between said fluoroplastic layer and said polymer layer is at least 15 N/cm.

27. A process according to claim 1 further comprising cooling said curable elastomer layer prior to application of said fluoroplastic composition.

28. A process for preparing a multi-layer article comprising:

- (a) providing a precursor article comprising a curable elastomer layer, said curable elastomer layer having an exposed surface available for application of a fluoroplastic layer;
- (b) extrusion coating a molten fluoroplastic composition comprising interpolymers of vinylidene fluoride units through a crosshead die onto said exposed surface of said curable elastomer layer to form a fluoroplastic layer,

said die comprising a die body that receives said molten fluoroplastic composition, an upstream opening for receiving said precursor article, a downstream opening, and a sleeve located at least partially within said upstream opening of said die that receives said precursor article and thermally insulates said curable elastomer layer prior to application of said fluoroplastic composition;

- (c) heating said fluoroplastic layer; and

(d) thermally curing said curable elastomer layer subsequent to heating said fluoroplastic layer to form a multi-layer article comprising a fluoroplastic layer and an elastomer layer.

29. A process for preparing a multi-layer article comprising:

- (a) providing a precursor article comprising a curable elastomer layer, said curable elastomer layer having an exposed surface available for application of a fluoroplastic layer;

(b) extrusion coating a molten fluoroplastic composition comprising interpolymers of vinylidene fluoride units through a crosshead die onto said exposed surface of said curable elastomer layer to form a fluoroplastic layer,

said die comprising a die body that receives said molten fluoroplastic composition, an upstream opening for receiving said precursor article, a downstream opening, and a sleeve located at least partially within said upstream opening of said die that receives said precursor article and thermally insulates said curable elastomer layer prior to application of said fluoroplastic composition;

(c) placing a polymer layer on said fluoroplastic layer; and

(d) thermally curing said elastomer layer and polymer layer in a first stage at a first temperature and a second stage at a second temperature, the first temperature being lower than the second temperature, to form a multi-layer article comprising a fluoroplastic layer, an elastomer layer, and a polymer layer.